Citation:

Rolland-Cachera MF, Deheeger M, Akrout M, Bellisle F. Influence of macronutrients on adiposity development: a follow up study of nutrition and growth from 10 months to 8 years of age. Int *J Obes Relat Metab Disord* 1995; 19: 573-578.

PubMed ID: 7489029

Study Design:

Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To investigate the relationship between early nutrient intake and adiposity development.

Inclusion Criteria:

Children who attended Public Health Center in Paris at age 10 months and were followed through age eight years.

Exclusion Criteria:

Not specified.

Description of Study Protocol:

- The study was started in 1985 in Public Health Centers for children in Paris. Children were recruited among a population consulting for clinical examinations. In these centers, three examinations are offered free of charge at 10 months, two years and four years. At ages six and eight years, the dietitian visited the families at home. Dietary interviews and anthropometric measurements were recorded by the same well trained investigator in all subjects.
- A 45-minute "dietary history" was used to assess nutrient intake at age two, then verified at the end of the interview with a 24-hour recall.

Data Collection Summary:

Dependent Variables

- BMI at age eight
- Measured height and weight
- Subscapular skinfolds
- Total body fat and internal body fat
- Triceps skinfolds
- Percent body fat at age eight.

Independent Variables

- Dietary intakes at age two: Total energy, protein, fat and carbohydrate intake
- Dietary history method with information collected from child's mother verified by 24-hour recall.

Control Variables

- Baseline energy intake at age two years
- Baseline BMI at age two years
- Social class (father's occupation)
- Parental BMI: Self-reported by parents.

Statistical Analysis

- Correlation coefficients
- Mann-Whitney U test.

Description of Actual Data Sample:

- *Original sample:* 278 children were seen at the age of 10 months, 192 came back for second check up at two years, 162 for the third at four years and 126 at six years. At no age was there a significant difference between the BMI values of subjects who were followed up to age of eight and those who were lost.
- *Withdrawals/Drop-outs:* Loss to follow-up
- *Final sample:* 112 healthy, French children from 10 months to eight years of age
- *Location:* Paris, France
- *Race/Ethnicity:* French children
- *SES:* Not specified
- *Age:* 10 months to eight years.

Summary of Results:

- *Total energy:* The BMI at the age of eight years was positively correlated with energy intake at the age of two years, but this correlation became non-significant after adjustment for BMI at two years
- *Protein:* Protein (percentage of kcal) intake at age of two years was positively correlated with BMI and subscapular skinfold at eight years after adjustment for energy intake at two years and parental BMI
- *Macronutrients:* Correlation between percentage of CHO and fat at age two years and measurements at age eight years were negative, but did not reach significance level
- *After adjustment for social class:* After adjustment for the father's occupation, the correlations between intakes at two years and BMI at eight years are 0.20 (P=0.044) for energy, 0.20 (P=0.046) for the percent proteins, -0.02 (P=0.83) for percent fat and -0.01

(P=0.89) for the percent CHO.

Author Conclusion:

These results suggest that high protein diet early in life could increase the risk of obesity and other pathologies later in life.

Reviewer Comments:

Strengths

Longitudinal nature of the study.

Weaknesses

- *Correlations are based on a single dietary assessment performed at age two*
- *Parental weights and heights were self-reported.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	No
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	No

2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	No
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
3.	**Were study groups comparable?**	N/A
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	N/A
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A

5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	No
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes

8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	N/A
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes